No. Orchards	Scales Examined	Parasitized	Not Parasitized	Per Cent. Parasitized	Per Cent. Not Parasitized	Highest Per Cent. in Any Orchard	Lowest Per Cent. in Any Orchard	Greatest Number Parasitized in 100	Least Number Parasitized in 100
			San Joaquin Valley						
27	31,200	1,918	29,282	6.15	93.85	32.25	1.9	45	0
			Sacramento Valley						
11	14,500	1,916	12,584	13.21	86.79	23.15	2.38	60	0
			Santa Clara Valley						
10	4,800	644	4,156	13.42	86.58	20.5	4.5	23	3
			Napa Valley						
9	7,200	971	6,229	13.49	85.51	17	11	22	7
			Sonoma Valley						
9	6,000	2,210	3,790	36.83	63.17	47.6	20.33	55	15
			Grand Total California						
66	63,700	7,659	56,041	12.02	87.98	47.6	1.9	60	0

H. J. QUAYLE

UNIVERSITY OF CALIFORNIA,
BERKELEY

EXPERIMENTS ON EARTH CURVATURE

AFTER reading my article on earth curvature[1] Mr. H. F. Dunham, of New York, called my attention to similar experiments reported

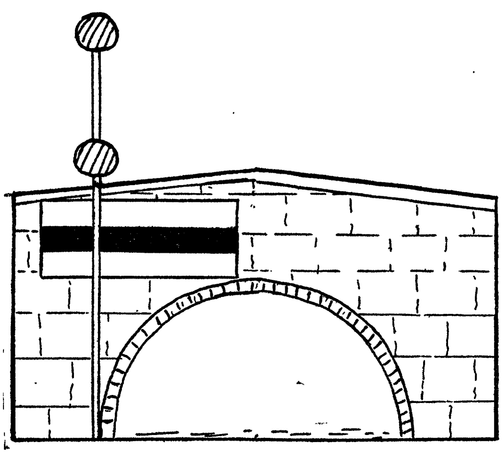

FIG. 1

by Mr. Alfred Russel Wallace.[2] A brief sketch of Wallace's experiment and its results may possibly be of interest to the readers of SCIENCE.

In 1870, through the medium of the public press, a Mr. John Hampden wagered £500 that the convexity of the surface of any inland water could not be proved. Mr. Wallace accepted the challenge. The old Bedford Canal was chosen for the experiment and a six-mile stretch between two bridges selected as the site. On the higher of the two bridges a white sheet, six feet long and three feet wide, was fastened. Along the center of the sheet parallel to the water was a six-inch black band, the lower edge of which was at the same height above the water as the parapet of the second bridge. At the half-way point a pole with two red discs, four feet apart, was erected in such a way that the center of the upper disc was at the same height as the center of the black band. A six-inch telescope, resting on the parapet of the second bridge, was used for sighting. The result, as seen through the telescope, is shown in the accompanying figure. A second experiment was performed with a spirit-level.

The sequel of the experiment is almost as interesting as the experiment. The referee for Mr. Hampden, a devotee of the flat earth school, insisted, on looking through the telescope, that the three points were in a straight line. Hampden, who refused to look through the instrument, accepted the statement, although Wallace's referee declared that the curvature was shown. An umpire, chosen to settle the difficulty, awarded the money to Wallace. Then followed a remarkable series of libels, persecutions and recriminations. As late as 1885 Hampden published, among other things, the statement that "no one but a degraded swindler has dared to make a fraudulent attempt to support the globular theory." Wallace sums up his experience in this matter thus: ". . . two law suits, the four prosecutions for libel, the payments and costs of the settlements amounting to considerably more than the £500 pounds I received from Hampden, besides which I bore all the costs of the week's experiments, and between fifteen and twenty years of continued persecution."

The whole story as presented by Wallace is

[1] "A Simple Method of Proving that the Earth is Round," *Nat. Geog. Mag.*, XVIII., 771.

[2] "My Life," Alfred Russel Wallace, Vol. II., 381–393.

a most astounding series of libels, against which he seemed to have been utterly powerless.

ROBERT M. BROWN
STATE NORMAL SCHOOL,
WORCESTER, MASS.

A SIMPLE CONTINUOUS ELECTRIC CALORIMETER FOR STUDENTS' USE

FOR several years we have been using, with considerable success, a simple form of the continuous-flow calorimeter for measuring Joule's equivalent in the electrical laboratory work of our elementary students. I venture to describe the apparatus here in the hope that it may commend itself to those engaged in practical work, as being simpler of operation than the older electrical methods of measuring this important constant.

A glass tube, about 50 cm. long and 2 to 3 mm. internal diameter, is cemented at both ends to brass collars carrying washers and nuts, which screw into brass castings drilled out to receive suitable thermometers. A heating wire, of about 10 ohms, coiled in a long helix, passes through the tube and is soldered to the brass collars. The helix serves to break up the stream-lines, and thoroughly mix the water as it flows through. A copper or tin vessel with overflow maintains a constant head of water from the city mains at any desired elevation, and a tube conveys the water to the inflow end of the calorimeter. An air trap, made from an inverted thistle tube, serves to catch any air bubbles liberated or carried down by the water. The temperature of the inflowing water is measured on the thermometer. After passing through the flow tube, the water passes out at the outflow end to a suitable measuring vessel. The temperature of the outflowing water is recorded at regular intervals on the second thermometer. The upper end of the brass T, to which the outflow pipe is attached, is open to the air and establishes the head independent of the exact level of the end of the outflow pipe. Having obtained a reading on the two thermometers before any heating current is turned on, the electrical circuit is completed, and after four or five minutes, during which the temperature of the outflow water becomes steady, readings are commenced. These consist in measuring the current at regular intervals on a tangent galvanometer or a Weston ammeter and reading the inflow and outflow temperatures during the time taken to obtain a suitable amount of water to weigh,

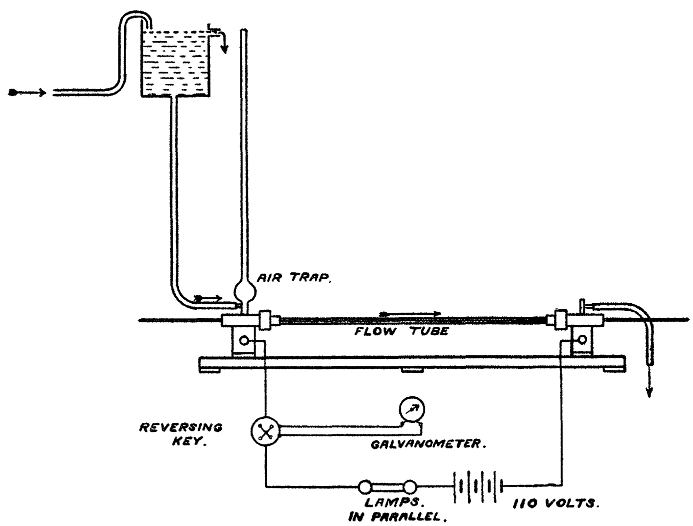

FIG. 1